Maximization of Neumann eigenvalues under diameter constraint

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In this talk we study the maximization problem of the Neumann eigenvalues under diameter constraint. We start by presenting a sequence of domains Ω_ϵ for which $D(\Omega_\epsilon)^2\mu_1(\Omega_\epsilon)$ goes to infinity.

We then define the profile function f associated to a domain $\Omega \subset \mathbb{R}^d$, assuming that this function is β-concave, with $0 < \beta \leq 1$, we will give sharp upper bounds of the quantity $D(\Omega)^2\mu_k(\Omega)$ in terms of β. The bounds will go to infinity when β goes to zero. This will also give a new proof of a result by Kröger, namely sharp upper bounds for $D(\Omega)^2\mu_k(\Omega)$ when Ω is convex (that correspond to $\beta = (d-1)^{-1}$). The proof of this results are based on a maximization problem for relaxed Sturm-Liouville eigenvalues.

This talk is based on a joint work with Antoine Henrot.